Pocatello Data Center Basis of Design

DESIGN-BUILD SERVICES
FOR POCATELLO SERVICE CENTER

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PART I. – BASIS OF DESIGN

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I.A General Description

The intent of this Basis of Design is to provide the conceptual definition of Project Pocatello Data Center, which will consist of a 24,800 sf +/- Data Hall plus future Data Hall expansion of 8,000 sf +/-. Thus, a total of 32,800 sf +/- will be dedicated as Data Hall space. The Data Hall plus associated support space will have a combined one story area of 104,000 sf +/-. In addition there is a three story Warm Lit Shell addition to the existing Administration building which will be an add alternate to the base bid. In this document, the term D/B (Design/Builder) is equivalent to the Contractor.

Key general design criteria for the project include but are not limited to:

1) Data Center: Non-separated mixed use occupancy. Type II-A construction
2) Warm Lit Shell (Add Alternate): Non-separated mixed use occupancy with a primary Business Occupancy. Type II-B construction.
3) Except for means of egress, building design shall comply with requirements of the latest edition of the IBC.
4) Means of egress systems shall comply with requirements of the latest edition of NFPA 101, Life Safety Code
5) Data Center's fire protection to comply with requirements of the latest edition of NFPA 75, Standard for the Protection of Information Technology Equipment
6) Structural design criteria with site-specific adjustments per local codes and ordinances (per ASCE 7-05).
7) Occupancy Category IV (Essential Facility) per requirements of ASCE 7-05's Table 1-1.
8) The data center shall be designed in a flexible, scalable, expandable manner that allows for future growth and acceptance of new technologies.

I.B General Building Codes & Standards

1. The International Building Codes published by International Code Council (ICC) to include, but not limited to:

    a. International Building Code, 2012 ed.
    b. International Mechanical Code, 2012 ed.
    c. International Plumbing Code, 2012 ed.
    d. International Fuel Gas Code, 2012 ed.

2. The National Fire Codes (NFC) published by National Fire Protection Association (NFPA) to include, but not limited to:
    a. NFPA 10, 2010 ed. – *Portable Fire Extinguishers*
    b. NFPA 13, 2010 ed. – *Installation of Sprinkler Systems*
    c. NFPA 70, 2014 ed. – *National Electric Code*
    d. NFPA 72, 2010 ed. – *National Fire Alarm Code*

3. ICC/ANSI A117.1, 2003 ed. – Accessible and Usable Buildings and Facilities Department of Justice ADA Standards for Accessible Design – 2010.

4. Where conflicts exist between codes, the code more stringent will be followed.

I.C Reliability

Pocatello Data Center is considered an essential facility housing critical IT components. The data center facility IT functions and supporting infrastructure shall be designed and constructed at the Tier III level as defined by the Uptime Institute ™ standards. As a reference the Uptime Institute ™ white paper "*Tier Classifications Define Site Infrastructure Performance*" and "*Data Center Site Infrastructure Tier Standard: Topology*" are to be utilized as the reference for achieving the requirements.

The following excerpt of the Uptime Institute ™ white paper "*Data Center Site Infrastructure Tier Standard: Topology*" is to serve as an overall summary, and not a complete list:

I.C.1 Fundamental requirements:

a. A Concurrently Maintainable data center has redundant capacity components and multiple independent distribution paths serving the critical environment. Only one distribution path is required to serve the critical environment at any time.
b. All IT equipment is dual powered as defined by the Uptime Institute's ™ *"Fault Tolerant Power Compliance Specification, Version 2.0*" and installed properly to be compatible with the topology of the site's architecture. Transfer devices, such as point-of-use switches, must be incorporated for critical environment that does not meet this specification.
c. At a minimum, twelve hours of on-site fuel storage for 'N' capacity. *(Please note that the requirements for Project CEF West exceeds this by requiring 72 hours of on-site fuel storage for 'N' capacity.)* Dual Corded Equipment Installation and corresponding infrastructure provisions for fault tolerance at IT device level.
d. The concept extends to subsystems required to support the critical white space such as control systems for the mechanical plant, start systems for engine generators, emergency power off (EPO) controls, power sources for cooling equipment and pumps, isolation valves, cooling and heating equipment, pumps, piping, makeup water systems fuel oil systems, and others.
e. Ancillary systems, such as fire detection, must be integrated so as not to cause an outage when they are removed from service.

I.C.2 Tier III Performance Confirmation Tests:

a. Each and every component and element in the distribution paths can be removed from service on a planned basis without impacting any of the critical environment.
b. There is sufficient permanently installed capacity to meet the needs of the site when redundant components are removed from service for any reason.

e

Although it is a requirement that Pocatello Data Center be designed and constructed to achieve certification to Tier III by the Uptime Institute, there are additional reliability requirements beyond Tier III. These additional requirements are described in Part II of the POR document, to be issued with the Phase II RFQ at a later date.

I.D Scalability

It is the intent of Pocatello Data Center that the facility be designed and constructed such that the building and supporting infrastructure are installed and operated in a flexible, scalable manner. This will allow the data center to expand within the current footprint beyond the initial installed capacity to full build out without any interruption in service during any expansion.

The data center shall be designed such that the infrastructure is capable of supporting the day one IT and total power/cooling requirements but be able to expand to the final power/cooling requirements in a scalable manner. The initial IT installation will be 2.7MW with capability to grow to 5.4 MW of IT power. The facility shall be designed and constructed such that the expansion of the data center IT operations as well as the power and cooling supporting infrastructure will not experience an interruption of service during this period.

The MEP systems will support growth of cabinet densities and changing IT configurations without impacting ongoing IT operations. A typical POD will consist of approximately 32 cabinets (16 per side) with hot aisle containment at 4'-0" and 5'-0" cold aisle. Each POD will be sized for a total of 340 kW, but contain a mix of low, medium and high density cabinets. Initial cabinet densities will be a mix of 2 – 20kW/cab, with the ability to scale upwards to 30 – 40 kW/cab in the future.

In addition to the facility infrastructure, the existing site utility plan will show phased relocation to ensure continuous operation of the existing Administration Building and supporting Data Center during construction. As it is considered an essential facility, the existing buildings must not incur any interruption of service. The Design/Build team is to provide plans and narratives with the approach to maintaining operation during construction in the Phase II submittal.

The Data Center shall incorporate a Data Center Infrastructure Management (DCIM) platform. The system shall conform to the Owner's specific requirements (to be released upon award of final contract to the successful Offeror), but as an overall summary shall be capable of performing the following functions:

1. Data center energy management (power, cooling, PUE calculations)
2. IT Capacity management and floor planning
3. Availability of critical IT systems and resources
4. Asset management with visual representation of the systems
5. Automation and connection to the various facility software platforms, including, but not limited to:
    a. Fire Alarm
    b. Physical Security

c. Energy Management Systems
d. Network Operations
e. Network Security
f. Change Management
g. Configuration Management

The DCIM software platform shall centralize the management of entire data center resources, such as hardware, software and power, etc., regardless of vendor/manufacturer. In addition, the system shall be modular with the ability to add additional modules as future requirements arise.

I.E Sustainability

As stated in the 2006 *Guiding Principles for Leadership in High Performance and Sustainable Buildings,* the *"Federal government is committed to designing, locating, constructing, maintaining, and operating its facilities in an energy efficient and sustainable manner that strives to achieve a balance that will realize high standards of living, wider sharing of life's amenities, maximum attainable reuse and recycling of depletable resources, in an economically viable manner, consistent with Department and Agency missions."*

It is within this mission that Pocatello Data Center adhere to the following sustainable design and construction principles:

1. The Project shall be designed and constructed to a minimum of Gold Certification under the LEED for New Construction Rating System. The project may not submit for actual certification.
2. The Project shall conform to the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings* set forth in the 2006 Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding.
3. The Project shall achieve energy performance 30% beyond ASHRAE 90.1 – 2013
4. The Project shall meet at least 30% of hot water demand with solar hot water if life-cycle cost effective.
5. The Project shall investigate renewable energy from "new" sources if life cycle cost effective.
6. The Project shall reduce potable and landscaping water consumption).
7. The Project shall maintain or restore the property's pre-development hydrology as to temperature, rate, volume, and duration of flow through the employment of low impact design strategies.
8. The Project shall incorporate advanced metering for electricity, water, steam, natural gas, and any other utility..
9. The Project shall divert at least 50% of construction and demolition materials and debris from disposal.
10. The Project shall minimize consumption of energy, water, and materials through cost effective, innovative strategies, such as a highly reflective roof..
11. The Project shall incorporate bio based, environmentally preferable, energy-efficient, water-

efficient, and recycled-content products.

I.F Energy Efficiency

As it is the desire of the Federal Government to design, build, and operate facilities in an energy efficient manner Pocatello Data Center shall achieve the following:

1. The Project shall achieve energy performance 30% beyond ASHRAE 90.1 – 2013. The performance path (ECB method) must be pursued to demonstrate savings through alternative and innovative energy-efficiency measures.
2. The mechanical cooling system shall take advantage of the local climatic conditions through the use of waterside free cooling (economizer) operation. **Airside economizer systems will not be accepted as a solution at the IT data floor.**
3. The mechanical cooling system and data center shall utilize the recommended best practices of ASHRAE TC 9.9 Thermal Guidelines for Datacom Facilities (2011).
4. The data center shall implement strategies for electrical distribution efficiency including but not limited to high efficiency motors (with VFD operation), UPS and LED lighting.
5. The facility shall achieve a Power Usage Effectiveness (PUE) of no greater than 1.4 (annualized average) as measured at IT cabinet. Preference will be given to systems which drive a more efficient PUE metric, while meeting all other prescriptive requirements.

    a. Power Usage Effectiveness (PUE) using source energy consumption is the preferred energy efficiency metric for data centers. PUE is a measurement of the total energy of the data center divided by the IT energy consumption.
    b. For a dedicated data center, the total energy in the PUE equation will include all energy sources at the point of utility handoff to the data center owner or operator.

6. PUE™ modeling and measurement calculations are to be defined by the Green Grid® white paper "*PUE™: A Comprehensive Examination of the Metric*" © 2012 The Green Grid®. The modeling and measurement level shall be consistent with the Level 3 (L3) Advanced measurement as defined in the above:
7. IT Equipment Energy measurement at the IT Equipment Input (rack PDU, plug strips or the IT equipment itself)
8. Total Facility Energy measurement at the Utility Input (Utility Service Entrance)
9. Measurement Interval shall be continuous (15 minute increments or less)
10. PUE modeling in the Phase II RFQ response shall be calculated at the following conditions:
    a. 50% of the Day 1 IT load (1.35 MW)
    b. 100% of the Day 1 IT load of (2.7 MW)
    c. 100% of the Final total buildout IT load (5.4 MW)
11. The BMS shall be capable of measuring and storing the data related to the PUE calculation to provide trending over the year at the L3 measurement interval level.

I.G Security

Pocatello Data Center has been designated to meet the requirements and be certified as an ISC (Interagency Security Committee) Level IV Protection facility. All associated Interagency Security Committee Level IV design planning, tactical strategies and mitigation measures shall be included in the documents to meet the functional requirements of the Pocatello Data Center mission.

The primary focus of the security section is the survivability of the Data Center facility, and the protection of people and critical equipment. The design performance goal shall be the comprehensive design development of the conceptual security elements and components described in the security section.

See Part II, Security Requirements, issued with the Phase II RFQ for detailed criteria.

I.H Building Information Modeling (BIM) Requirements

Use of BIM is required on this project. The primary goal of BIM is to promote value-added digital visualization, simulation, and optimization of technologies to increase quality throughout overall design and construction phases. It is a project requirement to use BIM as the primary design, coordination, communication and documentation platform. A final BIM model will be given to the Owner post facility Commissioning is complete. The BIM modeling software will be further utilized to facilitate the operations and maintenance activities of the project.

I.I Environmental Effects

The offeror shall consider the possible effects of climate change and other environmental parameters, and develop a resilient and sustainable facility that can withstand these effects.